New Species of *Parobisium* Chamberlin

(Arachnida: Chelonethida)

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Chamberlin (1930) proposed the subgenus *Parobisium* as distinct from *Neobisium*, *sensu stricto*, according to the placement of tactile setae on the fixed finger of the chela. *Parobisium* was elevated to generic rank by Chamberlin in 1962. In *Neobisium* Chamberlin the tactile setae are arranged in a distal group of four (*et*, *est*, *it*, and *ist*), and a basal group of four (*esb*, *eb*, *isb*, and *ib*). The arrangement of these setae in the genus *Parobisium* is three in the distal group and five in the basal group, with *ist* (Fig. 3) becoming the fifth basal seta.

In addition to the type species, *P. hesperum*, Chamberlin (1962) described a troglophilic species, *P. charlottae*, from Redmond Lava Cave, Deschutes County, Oregon. The two California species proposed in this paper inhabit humus, as apparently does *P. hesperum*.

Parobisium hastatus Schuster, new species

(Figs. 1–6)

MALE.—Total length, excluding chelicerae, 2.55 mm. Carapace (Fig. 1) 570 μ long, 675 μ wide; epistome a single blunt tooth; both pairs of eyes of subequal size; chaetotaxy 4 : 6 : 24. Tergal chaetotaxy 7 : 12 : 12 : 12 etc. Anterior genital operculum (Fig. 6) with 19 setae. Chelicera (Fig. 2) 445 μ long, 215 μ wide. Palpal trochanter 360 μ long, 170 μ wide; femur 640 μ long, 164 μ wide; tibia 497 μ long, 202 μ wide; chela 1,100 μ long, 285 μ wide; 295 μ deep, movable finger 638 μ long. Coxa IV (Fig. 5) bears 11 setae; pars tibialis of femur II bears 12 setae (Fig. 4).

FEMALE.—Similar to the male except only six to eight small setae on anterior genital operculum; posterior operculum without median anterior setae; median cribriform plate large, triangular; about 15 lateral cribriform plates of from 1 to 15 pores.

Holotype male.—FROM SIX MILES SOUTH EL DORADO, EL DORADO COUNTY, CALIFORNIA, 28 November 1964, in oak litter, J. S. Buckett, M. R. Gardner. Paratypes are four males, two females, and two nymphs, same collection. Other California specimens were taken from the following localities: Carson Ridge, Marin County, 1 January 1961, manzanita litter, C. W. O'Brien; 14 February 1959, cypress litter, J. R. Powers. Bear Valley, Mariposa County, 25 January 1961, D. W. Price. 10 miles south Monticello, Napa County, 6 January 1959, R. O. Schuster. 4 miles west Newcastle, Placer County, 3 January 1959, F. C. Raney, R. O.

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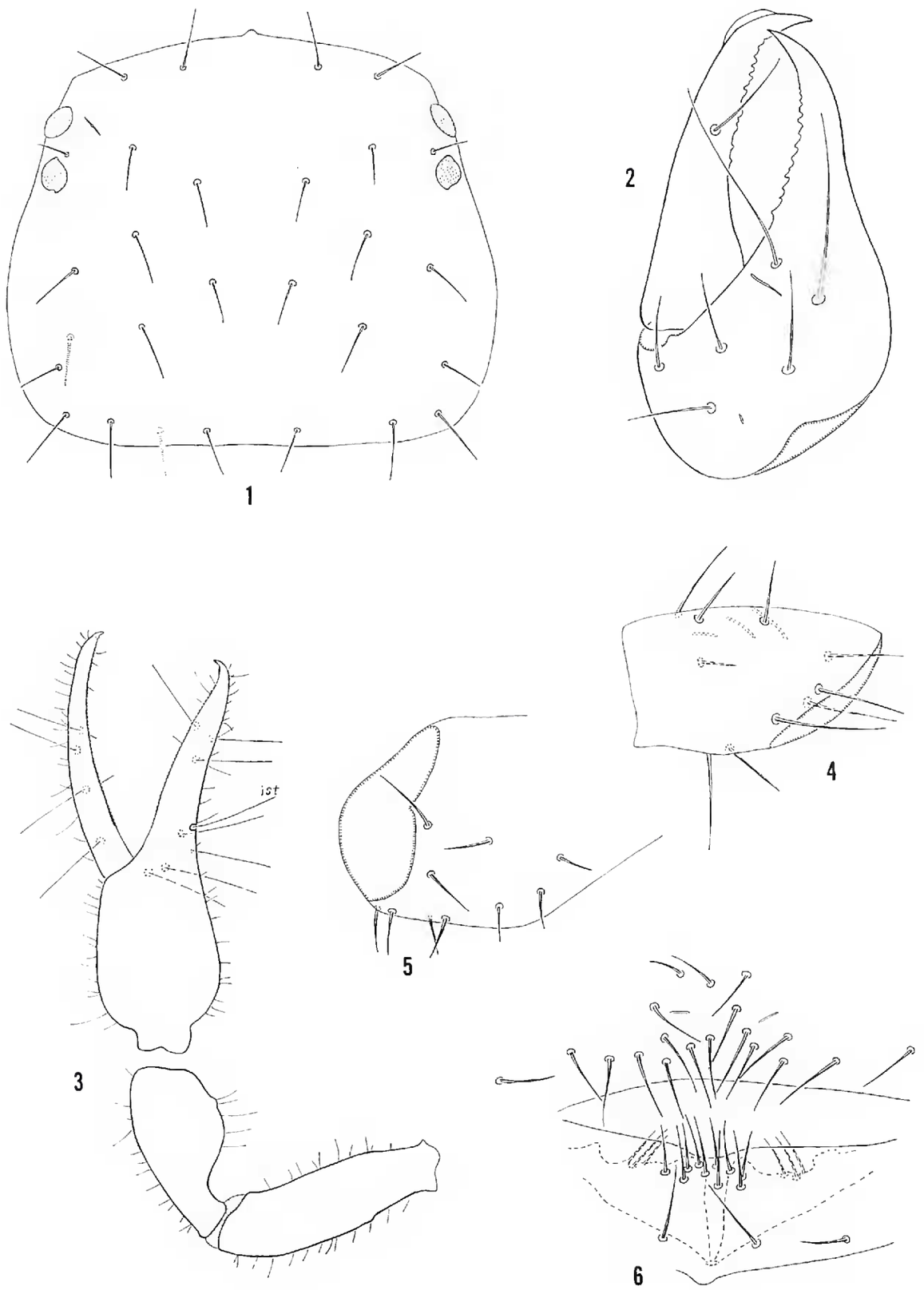


FIGS. 1–6. *Parobisium hastatus* Schuster, new species. FIG. 1, carapace (spurious setae dotted); FIG. 2, chelicera; FIG. 3, palpal femur, tibia, and chela; FIG. 4, femur II pars tibialis; FIG. 5, coxa IV; FIG. 6, chaetotaxy of male anterior and posterior genital operculi.

Schuster. Dutch Flat, Placer County, 2 March, rotting pine, R. L. Westcott. 7 miles northeast Santa Rosa, Sonoma County, 26 November 1964, J. S. Buckett. 6 miles north Rumsey, Yolo County, 9 February 1960, R. O. Schuster, L. M. Smith.

The specimens vary considerably in size and in setation. Length of the palpal femur ranges from 570 μ to over 670 μ. The posterior margin of the carapace has six, seven, or eight setae and the total number is generally between 24 and 28. The cheliceral hand has six or seven setae, and the marginal setae of the tergites vary from seven to nine (tergite I), and 11–15 for successive tergites.

The following combination of characters identify both sexes: palpal femur less than 700; coxa IV with 8–12 setae; pars tibialis of femur II with 10–12 setae.

Parobisium hesternus Schuster, new species

(Figs. 7–10)

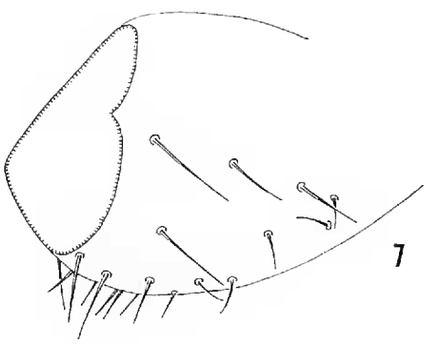
MALE.—Total length, excluding chelicerae 2.35 mm. Carapace 640 μ long, 800 μ wide; epistome a single blunt tooth; both pairs of eyes of subequal size; chaetotaxy 4 : 7 : 27 (perfect symmetry would give 4 : 8 : 28). Tergal chaetotaxy 9 : 13 : 12 : 12 : 13 : 12. . . . Anterior genital operculum (Fig. 10) bears 37 setae; five pairs of internal setae; posterior operculum with median anterior group of 16 setae, posterior margin bears 24 setae. Chelicerae (Fig. 9) 437 μ long, 225 μ wide. Palpal trochanter 380 μ long, 181 μ wide; femur 672 μ long, 178 μ wide; tibia 545 μ long, 230 μ wide; chela 1,065 μ long, 322 μ wide, 330 μ deep, movable finger 570 μ long. Coxa IV (Fig. 7) bears 16 setae; pars tibialis of femur II (Fig. 8) bears 16 setae.

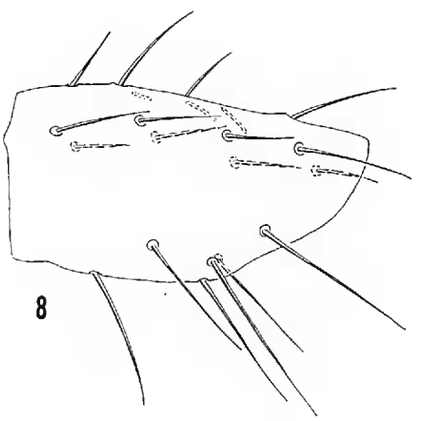
FEMALE.—Similar to the male except only 10 small setae on anterior genital operculum; posterior operculum without median anterior setae; cribriform plates similar to those of *P. hastatus*.

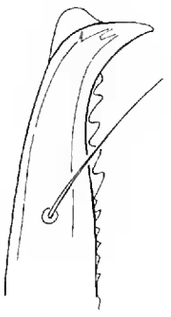
Holotype male.—FROM RIVERTON, EL DORADO COUNTY, CALIFORNIA, 22 February 1958, R. O. Schuster. Paratypes, two males and two females, same collection. Specimens considered to be conspecific but not included in the paratypic series were taken from near Bear Valley, Mariposa County, 25 January 1961, D. W. Price, and Yosemite National Park, Mariposa County, 6 February 1954, R. O. Schuster.

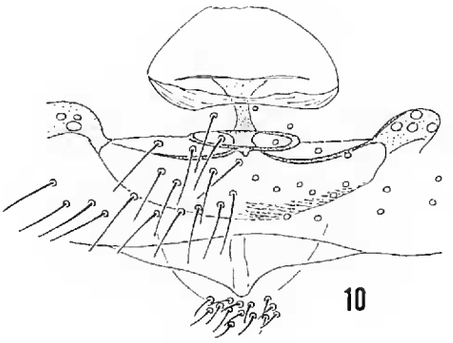
In California this species is known only from the Sierras. A few examples from Idaho and Utah indicate that it may be widespread in western North America.

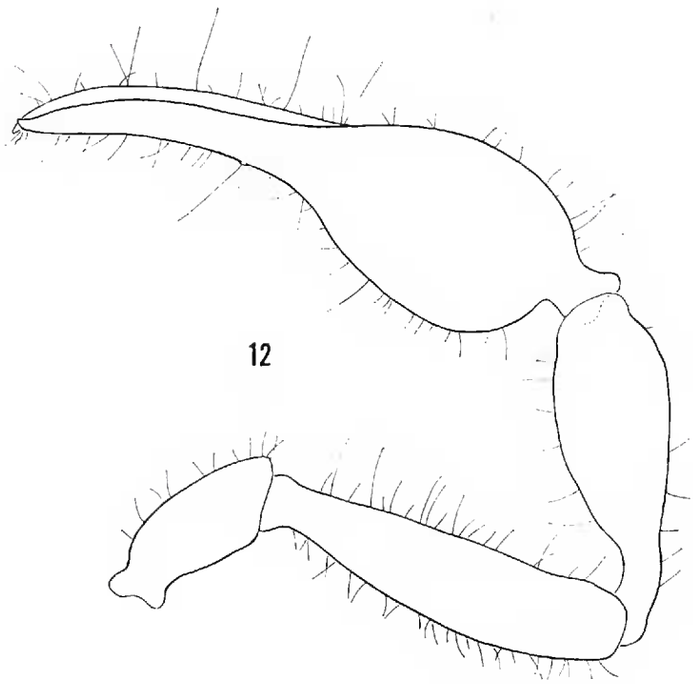
The shortest palpal femur of *P. hesternus* measured 668 μ, the longest 840 μ; the narrowest measured 181 μ, and the widest 235 μ. The average length to width ratio for 13 specimens was 3.73, the range 3.5 to 4.0, with the most specimens (5) having a ratio of 3.6. These measurements

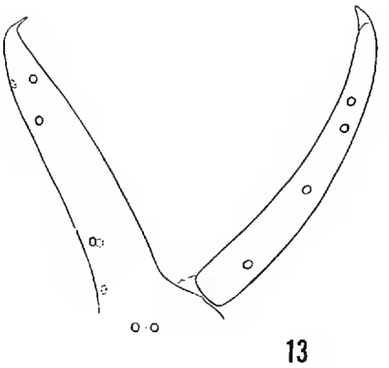












FIGS. 7–10. *Parobisium hesternus* Schuster, new species. FIG. 7, coxa IV; FIG. 8, femur II pars tibialis; FIG. 9, movable member of chelicera; FIG. 10, male genital area (setae of anterior operculum omitted from right side). *Parobisium hesperum* (Chamberlin), FIGS. 11–13. FIG. 11, movable member of chelicera; FIG. 12, palpal segments; FIG. 13, location of tactile setae of chela.

for *P. hastatus* were: shortest femur 562 μ, longest 672 μ, narrowest 161 μ, and widest 191 μ. The length to width ratio averaged 3.58 (19 specimens), the range 3.2 to 4.0, with the most specimens (5) having a ratio of 3.5. The length to width ratios are therefore useless as a specific character, and size distinguishes only individuals at the extremes. However, both sexes of this species are identified by the following combination of characters: palpal femur between 660 μ and 850 μ; coxa IV with 14 to 16 setae; pars tibialis of femur II with 14–16 setae.

KEY TO SPECIES OF PAROBISIUM

1. Eyes reduced or absent; palpal femur longer than 1,000 μ; galea of movable cheliceral finger absent or having a narrow subtruncate form (Fig. 11) 2
   Eyes well developed; palpal femur shorter than 850 μ; galea of movable cheliceral finger wider, rounded (Figs. 2, 9) 3
2(1). Galea of movable finger absent; palpal femur and tibia each longer than 2.0 mm ..... *charlottae*
   Galea of movable finger present, narrow, subtruncate; palpal femur and tibia each between 1.0 mm and 1.5 mm ..... *hesperum*
3(1). Galeate knob of movable cheliceral finger a long, low crest; pars tibialis of femur II with 11–12 setae; coxa IV with about 12 setae; anterior genital operculum of male with about 20 setae ..... *hastatus*
   Galeate knob of movable cheliceral finger a short, rounded crest; pars tibialis of femur II with 18 setae; coxa IV with about 16 setae; anterior genital operculum of male with about 30 setae ..... *hesternus*

Some comments on the type of *P. hesperum* are given to allow comparison of *P. hesperum* with *P. hastatus* and *P. hesternus*. The holotype female of *P. hesperum*, JC 454.01001, has the following information on the slide: Cannon Beach, Oregon, 15 July 1927, in rubble under log, E. C. Van Dyke. The carapace is 1.10 mm long and the posterior margin has eight setae. Anterior eyes may be present. Approximate measurements of the palpal segment (Fig. 12) are as follows: Trochanter 765 μ long, femur 1,410 μ long, 300 μ wide; tibia 1,225 μ long, 400 μ wide; chela (incl. pedicle) 2,275 μ long, 655 μ wide, depth unknown, movable finger 1,150 μ long. The distal tactile setae of the chela occur proportionately closer to the tips than is the case for the smaller California species (compare Figs. 3 and 13). The galeate knob of the movable cheliceral finger (Fig. 11) is provided with obvious internal ducts.

A second female specimen from near Dunsmuir, Shasta County, California, compares favorably with the type.

LITERATURE CITED

CHAMBERLIN, J. C. 1930. A synoptic classification of the false scorpions or chela-spinners, with a report on a cosmopolitan collection of the same.—

Part II. The Diplosphyronida (Arachnida–Chelonethida). Ann. Mag. Nat. Hist., ser. 10, 5: 1–48.

1962. New and little-known false scorpions, principally from caves, belonging to the families Chthoniidae and Neobisiidae (Arachnida, Chelonethida). Bull. Amer. Mus. Nat. Hist., 123: 303–352.

New and Interesting Trichoptera

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Eight new species have been selected for description in this paper. Several of these are in genera in which only a few species are known and are only rarely found in collections. A new *Tinodes*, the ninth North American species; a new *Homoplectra*, the seventh species; and a new *Neothremma*, the third species in the genus, are described. A new *Limnephilus* is described which represents a radical departure from other described species in the genus. Unless stated otherwise, types are in the author's collection.

I would like to express my gratitude to Dr. H. H. Ross for comparing *Sortosa* n. sp. to his holotype *S. sisko* and *Helicopsyche* n. sp. to his holotype *H. piroa.* Thanks are also extended to Mr. Joe Schuh, Mr. J. D. Vertrees, Dr. D. W. Davis, and staff members of the University of California for collections used in this study.

AGAPETUS MALLEATUS Banks

The species, although widely distributed in central and southern California, is rare in collections. The male genitalia are adequately illustrated, but the characteristic fifth and sixth sternites, and the female genitalia have not been figured until now.

MALE.—Almost the entire fifth sternite is occupied by the heavily sclerotized, elliptical sensory organ (Fig. 1A). This consists of a bulbous pouch opening to the exterior along a median slit and an internal sclerotized tubular ridge lined with acute spicules which extend caudoventrad from the apex. Sixth sternum with blunt mesal process and a blackish line extending cephalad from a row of short dense setae; apical margin irregularly dark brown (Fig. 1B).

FEMALE.—Fifth sternum divided by a dark brown crescent-shaped line extending through basal two-thirds of sclerite. Sternum 6 bearing a short blunt mesal process (Fig. 1C), and a brown line extending dorsad from it. Genitalia as in Fig. 1D. Segment 7 heavily sclerotized dark brown, tergum projected caudad as a shelf;